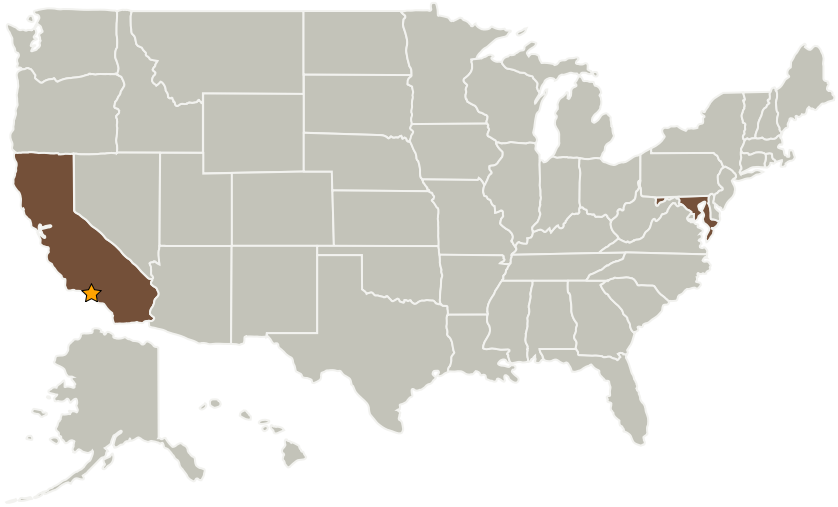
Venus Lander Experiment Vessel, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

Ceramic Composites Inc. (CCI) of Millersville, MD in association with Swales Aerospace of Beltsville, MD have evaluated an innovative approach for the design of a Venus probe to maximize the payload volume and mass, while increasing probe lifetime. CCI and Swales have evaluated state-of-the-art materials and concepts to create a combination of thermal management approaches which maximizes value to NASA such as: 1) augmentation of the passive insulation with phase change materials (PCM) and two-phase evaporation cooling to maximize thermal protection at minimal volume and mass, 2) providing system corrosion protection through reverse flow gas balance to prolong vessel, sensor and window life, and 3) replacement of the titanium pressure vessel with a polymer matrix composite to reduce vessel mass and increase payload mass. The analyses conducted in Phase I indicate that the baseline concept will provide a lifetime of approximately 35 earth hours (while also managing a continuous 150W load from the scientific equipment) with a 100kg mass savings compared to a system employing the same thermal management system with a titanium pressure vessel. The Phase II effort will focus on refining the concept; designing, manufacturing, and evaluating a subscale prototype.

Primary U.S. Work Locations and Key Partners



Venus Lander Experiment Vessel, Phase II

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Ceramic Composites, Inc.	Supporting Organization	Industry	Annapolis, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

December 2006: Project Start

December 2008: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors